Project CAPKOM: Fostering Web Literacy of People with Cognitive Disabilities

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Abstract

People with physical or sensory disabilities are a well-researched user group considering or with considerations to their needs and prerequisites to use the web, while potential users with cognitive disabilities lack adequate solutions to overcome barriers resulting from their disability. An innovative graphical user interface developed within the project CAPKOM intends to improve the web experience of people with cognitive disabilities by a twofold approach: the user interface will be instantly adaptable to the very different demands of people with cognitive disabilities and iterative user tests will feed results into software development activities, first exemplified by a community art portal for people with cognitive disabilities.

Keywords

Cognitive Disability, eAccessibility, Webdesign, Graphical User Interface

Background / State of the Art

An extensive set of rules and guidelines for designing, implementing and publishing barrier free websites and software focuses on general, technical accessibility from the perspective of different groups involved in providing content and information via the internet (WCAG; Nietzio, Scheer, and Buhler). Those rules guarantee accessibility and to some extent also usability for a broad scope of users with and without disabilities, including older adults.

People with cognitive disabilities face a different (if not even a reverse) situation as conventional navigation and "pure" textual description build profound obstacles (in getting information or using mainstream ICT) (Bohman). An example of a contradictory situation might be a flash-video explaining a website before use. This can be both annoying for mainstream users as well as very helpful for the target group. In recent years, a number of experts raised awareness of challenges in making the internet accessible for people with cognitive disabilities (Poulson and Nicolle; Pouncey). Most experts judge that accessibility for users with cognitive disabilities can be a far greater challenge than for those with other types of disabilities (Gregg). The individual needs of people with cognitive disabilities vary widely depending on grade and form of the disability.

Following studies and experience, translating websites word by word (e.g. into Easy to Read) or reading websites aloud leads to inefficient or inappropriate solutions. In order to find ways to comfort our most diverse target group in surfing the web on their own, CAPKOM aims at developing an innovative graphical user interface (independent technological platform and also available on mobile platforms) instantly adaptable to the needs of people with different types of cognitive disabilities.

The adaptability of the planned graphical user interface in the context of the CAPKOM project clearly targets users with cognitive disabilities. As part of the user testing, we monitor to what extent people with cognitive disabilities are able to act independently in using information and communication technologies to identify the necessary prerequisites.

Methodology

With the incentive of being part of an online art portal, initially adapted to the needs of people with cognitive disabilities (to display and discuss pieces of art by both artists with and without cognitive disability), we involved our target group and their caregivers from the beginning ("The Art Platform"). Following the results of user tests and rapid prototyping sessions, we paid special attention to text complexity and added symbols to support navigation and content. Following Bernasconi, the use of well introduced and known icons and symbols facilitates navigation, understanding, and use of a website. A follow up evaluation of the current situation with regard to barriers and difficulties, browsing behavior and IT skills of our target group shows the following most important categories and prerequisites to be kept in mind:

- Group description, "cross section"

  Which disabilities does the target group have?; Which restrictions do they have through their disability; What are they good at?

- Physical description, "individual persona"

  Name; age; living conditions (How and where do they live?); Description of the forms of their disability; Description of their personal skills; Description of their use of technologies (Which kind of electronic devices does he/she use?, For what and how?);

- Scenarios / use cases

  Typical use environment (Where and how does the person surf the Internet?; At home, at work or in school? To play, to network, to learn?);

- use and user interaction paradigms

R & D Idea

From a technical perspective, our targets were:

- Design and development of a software-framework for the creation of user interfaces for people with cognitive disabilities

- Implementation of this framework using the example of:

  · A community art portal ("The Art Platform")

  · An application for smartphones

  · A communication software suite (already sketched and in development by PLATUS, a project partner and company working in the area of Augmented and Alternative communication (AAC)) (Platus Learning Systems)

- Based on the findings and results from intensive user testing (our panel comprises around 400 individuals with a very diverse set of abilities and competences), we will develop mobile applications for smartphones and software solutions for Augmented and Alternative Communication (AAC).

- Last but not least we plan to develop a wizard to easily adapt the user interface to the needs of the respective user with cognitive disabilities.

This required a special methodology:

- Research and development of a knowledge model adapted to people with cognitive disabilities,

- Development of a symbol based communication system adapted for the specific needs of people with cognitive disabilities,

- Provision of an adequate user interface adapted to the project framework,

- Experience-prototyping for iterative software development and evaluation routines

First Results

We designed and used different mock ups with symbols and navigation structure and implemented them within a user interface and a website (a community art portal) for people with cognitive disabilities, containing some pages for uploading, showing and discussing self-made pieces of art with:

- An easy to use, color indicated navigation scheme

- Symbols added to textual indicators

- Simplified text

We additionally gained useful information on the preparation of an action plan following focused discussions with experts and caregivers for people with cognitive disabilities:

- A separate database should give the opportunity to upload a user's own icons or pictures.

- The portal should provide the possibility to learn a certain structure of websites, which supports the target group by giving them tools, methods, community experiences and training actions for other internet sites and platforms.

- Possibility to easily implement, own (known), and restore default symbols.

- Undo-function, acting as safety net mechanism.

- AAC: icons with text, speech output, mouse-over-function.

- Clear distinction between website content and navigation area.

- Search-function placed in the upper right part of the site.

- Navigation placed on the left side, with pointed out buttons and control elements enriched by big icons, leading to a better overview and orientation.

- A short introduction of the platform is necessary, especially in making settings and adjustments.

As displayed in Figure 1, we refrained from using color based navigation as it turned out to be more distracting than helpful. Additionally, we took all texts on this portal and translated them into an easier language version following the "European standards in easy to read and use information" (Inclusion Europe; WAI W3C). Last but not least, we adapted the whole structure of the page to a better overview and usability.
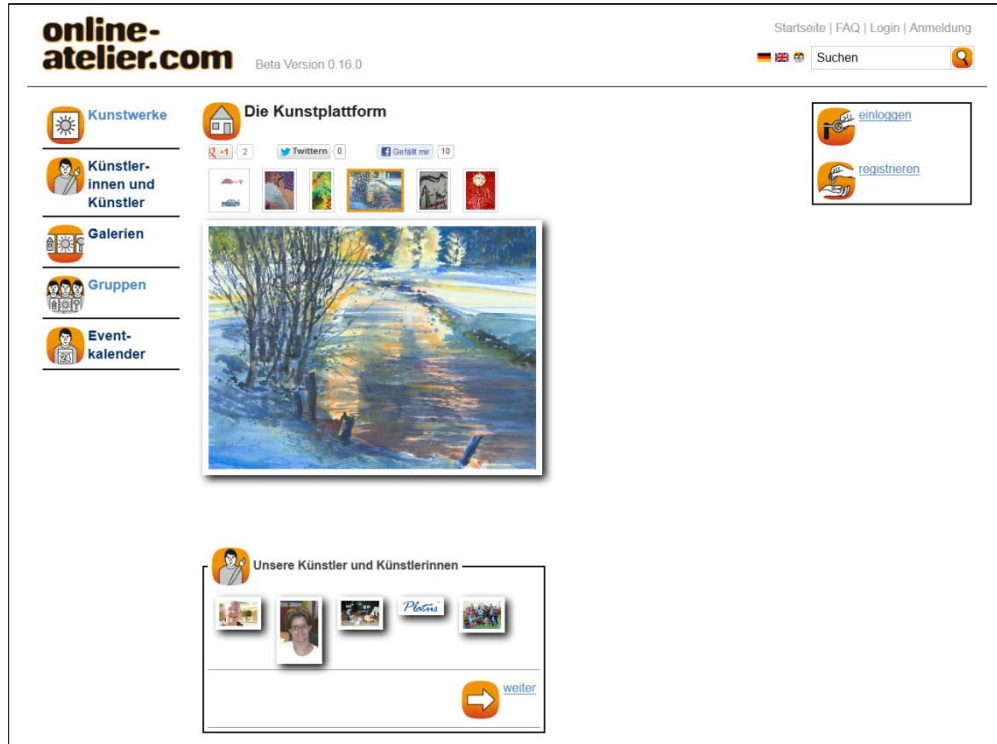
Fig. 1. The CAPKOM Art Portal in Version 2, After User Testing and Expert Discussions

Conclusions

With the CAPKOM project and all related applications, we aim at two primary goals:

- Ethical goal: To include as many people as possible in innovative applications of
  information and communication technologies and bring them together (e.g. in a
  community art portal where they can express themselves and discuss their works) without
  barriers. In this context, the community art portal can be regarded as an easy and reliable
  starting point, which gives users the opportunity to learn how to realize the different
  possibilities provided by the internet.

- Practical goal: By using our example applications, we show how modern ICT and AT is
  best implemented and adapted to the needs of a very diverse user group and how this
  knowledge can also provide commercial benefit. There is a great demand for ICT for

people with disabilities but still, the supply is very limited. Concerning the commercial benefit, ever more people are getting access to the internet and the wired disability community continues to grow at incredible rates. Ultimately, there is a new market to be opened up (Paciello).

Project partners involved:

- Institute Integriert Studieren, JKU Linz, Austria: http://www.jku.at/iis

- Salzburg Research, Austria: http://www.salzburgresearch.at

- UTILO KG, Austria: http://www.utilo.eu

- Platus Learning Systems GmbH, Austria: http://www.platus.at

- Lebenshilfe Salzburg, Austria: http://www.lebenshilfe-salzburg.at

Works Cited

"The Art Platform for Galleries, Artists and Friends of Art." *Online-Atelier.com*. UTILO KG.

    n.d. Web. 15 October 2012. <http://www.online-atelier.com>.

Bernasconi, Tobias. *Barrierefreies Internet für Menschen mit geistiger Behinderung. Eine*

    experimentelle Pilotstudie zu technischen Voraussetzungen und partizipativen

    Auswirkungen. Oldenburg: BIS-Verlag der Carl von Ossietzky Universität Oldenburg,

    2007. Print.

Bohman, Paul. "Cognitive Disabilities Part 2: Conceptualizing Design Considerations."*WebAIM-*

    Web Accessibility in Mind. English Version, N.p., n.d., Web. 15 October

    2012.<http://webaim.org/articles/cognitive/conceptualize/>.

Gregg, Dawn. "Cognitive Accessibility Online." *Yahoo! Accessibility*. Yahoo! Inc. 13 Dec. 2010.

    Web. 15 October 2012. <http://yaccessibilityblog.com/wp/cognitive-accessibility-

    online.html.>

Inclusion Europe. *Information for All-European Standards On How to Make Information Easy to*

    Read and Understand for People with Intellectual Disabilities. 2009. Web. 15 Oct. 2012.

    <http://cop.health-rights.org/files/c/1/c1fbaaeb17db47800782d8721bd8b0db.pdf.>.

Nietzio, Annika, Birgit Scheer, and Christian Buhler. "How Long is a Short Sentence? A

    Linguistic Approach to Definition and Validation of Rules for Easy-to-Read Material."

    Proceedings of the 13th International Conference ICCHP 2012: Computers Helping

    People with Special Needs. Part 2. Ed. Klaus Miesenberger, Arthur Karshmer, Petr

    Penaz, Wolfgang Zagler. Linz: Springer Heidelberg, 2012. 369-76. Print.

online-atelier.com: Die Kunstplattform für Galerien, Künstler und Kunstinteressierte. UTILO

    KG, 4 Nov. 2011. Web. 15 Oct. 2012. <http://www.online-atelier.com/OnlineAtelier/>.

Paciello, Michael. G. *Web Accessibility for People with Disabilities.* Lawrence: CMP Books,

    2000. 11ff. Print.

"Platus Communicates." *Platus Learning Systems*. N.p., n.d. Web. 15 October 2012.

    <http://www.platus.at/en/platus.html>.

Poulson, David, and Colette Nicolle. "Making the Internet Accessible for People with Cognitive

    and Communication Impairments." *Universal Access in the Information Society*. 48-56.

    Berlin Heidelberg: Springer Verlag, 2013. Print.

Pouncey, Ian. "Web Accessibility for Cognitive Disabilities and Learning Difficulties."

    Dev.Opera. 4 Aug. 2010. Web. 18. October 2012.

    <http://dev.opera.com/articles/view/cognitive-disability-learning-difficulty/>.

WAI W3C. *WAI Web Accessibility Initiative*. N.p. 15 October 2012. Web. 6 June 2013.

    <http://www.w3.org/WAI/>.

"Web Content Accessibility Guidelines-WCAG 2.0." W3C Recommendation. n.P. 11 Dec. 2008.

    Web. 15 Oct. 2012. <http://www.w3.org/TR/WCAG/>.